BRS
BASIC RADIOLOGICAL SYSTEM
USER MANUAL

STEPHANIX

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FRANCE

CE

Este producto ostenta una marca CE de acuerdo con las disposiciones de la Directiva 93/42/CEE del 14 de Junio de 1993 sobre Productos Médicos.
This product bears a CE marking in accordance with the provisions of the 93 / 42/ EEC MDD dated June 14, 1993 .

STEPHANIX constantly strives to improve its products and, therefore, reserves the right to deliver, without prior notice, machines whose characteristics differ from those described here: nonetheless, these machines are still guaranteed to comply with regulations in force.

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TABLE OF CONTENTS

INTRODUCTION **6**
Preliminary Information 6
Explanations 6

GENERAL MANIPULATIONS **7**
Column and swivelling arm 7
Cassette holder 7
Light beam collimator 7
X ray tube 7

CONTROLS OF THE BRS **8**
Lungs and heart 8
Ribs 9
Abdomen 10
Urinary tract survey 11
Urinary bladder and inner pelvis 12
Skull 13
Sinuses and face 14
Mandible 15
Cervical spine 16
Thoracic and lumbar spine 17
Sacrum, lumbosacral junction and sacroiliac joints 18
Clavicle, scapula and shoulder joint 19
Humerus 20
Elbow 21
Forearm 22
Wrist, hand and fingers 23
Pelvis and hip joints 24
Femur 25
Knee 26
Leg 27
Foot and toes 28

TABLE **29**

CE

The CE mark on the system indicates that the unit is in compliance with the European Directive 93/42/CEE of the 14/06/93 concerning the medical devices.

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GUARANTEE CONDITIONS

It is the responsibility of the user to ensure that the government regulations respecting installation and operation of the equipment are observed.

Incorrect operation, or failure of the user to maintain the equipment in accordance with the schedule of maintenance relieves STEPHANIX or his agent from all responsibility for consequent non-compliance, damage, injury, defects and/or other malfunction.

The installation and equipment must not be used if any mechanical, electrical or radiation-emitting component is defective, or if the procedures described in the schedule of maintenance have not been carried out.

Changes and additions to the equipment may only be carried out by STEPHANIX or by third parties expressly authorized by STEPHANIX to do so. Such changes must comply with local regulations and accepted standards of good practice.

In case the power lines do not meet the specifications given in section A "Pre-installation" of the Service Manual, the BRS cannot reach its maximum performance and the standard use cannot be guaranteed.

Technical files (diagrams, parts list, measurement procedure and so on...) of the *Basic Radiological System* are available on request to STEPHANIX.

CARRIAGE CONDITIONS

Goods travel at owner's risk.
No contest shall be taken into account unless written reservations have been made on the consignment note, face to face to the carrier, upon receipt of the goods in case of apparent loss or damage.

During transportation and storage, the black cap of the H.T. tank must be neither unscrewed nor removed.

Crates and packing means made by STEPHANIX cannot be used for other purposes than carriage.

SAFETY AND PROTECTION

X-rays are not innocuous and can be dangerous if used badly. You must, therefore, take precautions even when following the instructions in this manual.

X-rays units manufactured by STEPHANIX comply with the strictest safety standards in force throughout the world (Europe, Japan, USA, etc.). They guarantee optimum protection against radiation risks.

Nonetheless, you are handling a unit specifically designed to generate X-rays to allow medical diagnosis on a film or using a digital imaging system. Consequently, despite the inherent safety of our equipment, we recommend using conventional commercially available equipment to protect yourself and your patient against scattered radiation risks.

↳ The following instructions must be strictly observed:

- Use the smallest possible X-ray field
- Use the shortest possible fluoroscopy time
- Use the lowest input dose necessary for efficient working
- Maintain the X-ray tube in good condition
- Keep as far away from the beam as possible
- During exposure, personnel not directly involved with the patient must go behind lead or lead-glass shielding

↳ Should any part of the equipment be damaged, it must be repaired or replaced before the equipment is returned to service.

↳ Equipment described herein is unsuitable for operation where and when flammable gasses or vapours are present.

↳ The user must always electrically disconnect the equipment from the mains before cleaning or disinfecting.

↳ Do not allow water or other liquid to enter the equipment, as such liquid may cause short circuits and /or some corrosion.

↳ It must be noted that some disinfectants vaporise, forming potentially explosive mixtures. Should such disinfectants be used, the vapours must first be allowed to disperse before the equipment is returned to use.

↳ In addition, it is vital that an authorized STEPHANIX distributor carries out the assembly, extensions, adjustments, modifications and repairs. Also, your radiology unit must be installed in premises that comply with IEC provisions and the standards in force.

↳ Due care must be taken to prevent injury to the patient. Ensure that patient's clothing cannot be trapped in the equipment. It is important that the patient hands remain on the tabletop.

↳ It is important that all personnel dealing with X-radiation be fully acquainted with the radiation protection.

In the event of failure to comply with these instructions, STEPHANIX shall not be held responsible for the safety, reliability and characteristics of the machine.

Your distributor will be pleased to help you with the initial use of your unit and to answer any subsequent questions you may have.

NOTE TO THE USER

You have just purchased a *Basic Radiological System*. We congratulate you on your choice, and are sure you will be fully satisfied with its use and diagnostic capabilities.

STEPHANIX radiology units offer high quality and advanced technology.

We recommend reading the user's manual carefully before using your unit, to become familiar with its operation and make the most of its performance.

Keep this manual in a safe place so that you can easily refer to it in the future.

Thank you for placing your confidence in STEPHANIX.

INTRODUCTION

PRELIMINARY INFORMATION

The B.R.S. system has been design by the WHO in order to comply with a need for a small equipment, easy to use and to manipulate for operator having a little knowledge in X ray units and techniques.

The B.R.S. system can be used with different X ray generators from STEPHANIX:
- N 32 HF, N 32 HFM, N 32 HFR
- N 40 HF
- N 50 HF

This manual explains shortly how to manipulate the B.R.S. system and gives a range of basic radiological techniques sufficient to enable 90% of the problems diagnosable through radiography to be routinely examined.
Concerning the X ray generator, the operator will have to refer to the relevant manual.

Since films, X ray cassettes and screens vary, the exposure required for each examination must be adjusted to local conditions by a fully qualified radiographer / X ray technologist when the machine is installed. If the film-cassette-screens combination is changed, readjustment of the exposure will be necessary for the best results.

When used by trained radiographers, techniques more complex than those shown in this manual can de carried out with the basic radiological system, serving the particular needs of specialists in various fields of medicine.

EXPLANATIONS:

ERECT	: standing or sitting up.
SUPINE	: lying on the back.
PRONE	: lying on the stomach.
OBLIQUE	: turned a little, usually at a 40° angle.
LATERAL	: lying with the side close to the cassette.
AP	: antero-posterior
PA	: postero-anterior

GENERAL MANIPULATIONS

COLUMN AND SWIVELLING ARM

- Up and down movement: the swivelling arm can go up and down just by pushing it in the right direction. the up and down movement is fully counter balanced by a counterweight inside the column. A manual brake, situated behind the column, on the up and down mechanism, can be used to block the movement to the right position.

- Rotation movement: the swivelling arm is fully counter balanced and can rotate in the vertical plane around its horizontal axis on the up and down mechanism. A big washer, with indication of the rotation angle, is attached to the swivelling arm. A manual brake situated on the front of the up and down mechanism is used to block the rotation movement.

CASSETTE HOLDER

The cassette holder is situated in the opposite position to the X ray tube ,and contain a fixed grid. To insert a cassette inside pull the handle situated on the front of the tray and put the cassette between the blocking parts which are also used to centre the cassette.

LIGHT BEAM COLLIMATOR

- Light: An halogen lamp can be switch on by pressing the button on the front of the collimator. An integrated timer allows to switch off this light after around 30 seconds in order not to overheat the collimator and the lead shutters.

- Lead shutters: the X ray beam can be reduced to the size of the cassette inserted in the cassette holder, by turning the two buttons situated in front of the collimator, in the appropriate direction. Coloured indications for positioning the shutters are also indicated on the cassette holder

X RAY TUBE

The X Ray tube is auto-centred on the cassette holder on the opposite side.

In some cases, it might be necessary to rotate the tube head in order to use the X Ray beam on an other system, like a wall Bucky or a fluoroscopy stand. It is possible to do it, just by rotating the tube head in the right direction. Adjustment of the surface of the beam can be made using the lead shutters of the light beam collimator.

CONTROLS OF THE B.R.S.

LUNGS AND HEART

- MATERIAL:

Cassette 36 x 43 cm with rare earth screens

- POSITION OF THE PATIENT:

Standing erect (chest PA)

Standing erect (chest lateral left or right)

Sitting erect (chest AP)

Supine (chest AP)

Lying on the right or left side ; horizontal beam (chest lateral decubitus AP or PA)

- PARAMETERS:

Adults:	kV:	from 90 to 110
	mAs:	from 2 to 12
Infants:	kV:	70
	mAs:	3

- OPERATING PROCEDURE:

1. Make sure the patient's shoulders are well pressed forward
2. Tell the patient to breathe in deeply and hold the breath
3. Expose
4. Tell the patient to breathe normally
5. For infants, use a 18 x 24 cm cassette, support the head and the legs and lie the infant on its back

RIBS

- MATERIAL:

  Cassette 36 x 43 cm with rare earth screens

- POSITION OF THE PATIENT:

  Standing or sitting erect ; left and right oblique (ribs oblique AP)

  Supine ; right or left oblique (ribs oblique AP)

- PARAMETERS:

Adults:	kV:	from 60 to 80
	mAs:	from 20 to 60
Infants:	kV:	70
	mAs:	2

- OPERATING PROCEDURE:

  1. Ask the patient to raise its arms
  2. Tell the patient to breathe in deeply and hold the breath
  3. Expose
  4. Tell the patient to breathe normally

ABDOMEN

- MATERIAL:

  Cassette 36 x 43 cm with rare earth screens

- POSITION OF THE PATIENT:

  Supine (abdomen AP)

  Standing erect (abdomen PA)

  Lying left and right side (abdomen, lateral decubitus)

- PARAMETERS:

Adults:	kV:	from 75 to 85
	mAs:	from 40 to 120
Infants:	kV:	70
	mAs:	25

- OPERATING PROCEDURE:

  1. Press the patient's abdomen against the cassette holder
  2. Tell the patient to breath out and hold the breath
  3. Expose
  4. Tell the patient to breathe normally
  5. For infants, use a 24 x 30 cm cassette, hold the child hanging by the upper arms

URINARY TRACT SURVEY

- MATERIAL:

  Cassette 36 x 43 cm with rare earth screens

- POSITION OF THE PATIENT:

  Supine (urinary tract AP)

- PARAMETERS:

Adults:	kV:	from 65 to 75
	mAs:	from 75 to 180
Infants:	kV:	70
	mAs:	20

- OPERATING PROCEDURE:

  1. Tell the patient to breath out and hold the breath
  2. Expose
  3. Tell the patient to breathe normally
  5. For infants, use a 24 x 30 cm cassette

URINARY BLADDER AND INNER PELVIS

- MATERIAL:

Cassette 24 x 30 cm with rare earth screens

- POSITION OF THE PATIENT:

Supine ; vertical beam angled 20° toward the feet

- PARAMETERS:

Adults:	kV:	from 65 to 75
	mAs:	from 75 to 180
Infants:	kV:	70
	mAs:	20

- OPERATING PROCEDURE:

1. Tell the patient to breath out and hold the breath
2. Expose
3. Tell the patient to breathe normally
5. For infants, use a 24 x 30 cm cassette

SKULL

- MATERIAL:

Cassette 24 x 30 cm with rapid screens

- POSITION OF THE PATIENT:

Supine ; horizontal beam (skull lateral)

Prone ; vertical beam angled 20° towards the feet (skull PA)

Supine ; vertical beam angled 20° towards the head (skull AP)

Supine ; vertical beam angled 30° towards the feet (skull semi-axial)

- PARAMETERS:

Adults:	kV:	from 65 to 75
	mAs:	from 32 to 80
Infants:	kV:	65
	mAs:	20

- OPERATING PROCEDURE:

1. Remove dentures, hair grips, or anything else in the hair
2. For supine position, the patient head should be raised on a foam rubber pad
3. For prone position, nose and forehead should be against the table and hands under the chest
4. Expose

SINUSES AND FACE

- MATERIAL:

Cassette 18 x 24 cm with rapid screens

- POSITION OF THE PATIENT:

Sitting erect (sinuses and face PA)

Sitting erect (sinuses or face semiaxial, or nose PA)

Sitting erect (sinuses, face, or nose lateral)

- PARAMETERS:

Adults:	kV:	from 70 to 90
	mAs:	from 25 to 50
Infants:	kV:	65
	mAs:	16

- OPERATING PROCEDURE:

1. Remove dentures, hair grips, or anything else in the hair
2. For face PA position, the patient nose should touch the cassette holder, face vertical
3. For face semiaxial position, tell the patient to open the mouth as widely as possible and place the chin against the cassette holder and tilt the patient's head back 45°
4. Expose

MANDIBLE

- MATERIAL:

Cassette 18 x 24 cm with rapid screens

- POSITION OF THE PATIENT:

Sitting erect (mandible PA)

Sitting erect (mandible oblique lateral)

Supine ; vertical beam angled 30° towards the feet (mandible AP)

Lying on the right (or left) side ; vertical beam angled 30° towards the head (mandible oblique lateral)

- PARAMETERS:

Adults:	kV:	from 65 to 75
	mAs:	from 25 to 63
Infants:	kV:	65
	mAs:	16

- OPERATING PROCEDURE:

1. Remove dentures, hair grips, or anything else in the hair
2. For mandible PA position, tell the patient to open the mouth as widely as possible and place the forehead and nose against the cassette holder
3. For mandible oblique lateral position, tilt the head inwards 15° so that the head and shoulder rest against the cassette holder, patient sit with the side of the head to be X rayed nearest to the cassette holder
3. For mandible AP position, tell the patient to open the mouth as widely as possible
4. For lying position in mandible oblique lateral position, tilt the patient head 15° towards the table
5. Expose

CERVICAL SPINE

- MATERIAL:

Cassette 18 x 24 cm or 24 x 30 cm with rapid screens

- POSITION OF THE PATIENT:

Sitting erect (cervical spine PA)

Sitting erect (cervical spine lateral)

Sitting erect (cervical spine oblique)

Supine ; vertical beam angled 15° towards the head (cervical spine AP)

Supine ; horizontal beam (cervical spine lateral)

- PARAMETERS:

Adults:	kV:	from 65 to 75
	mAs:	from 50 to 100
Infants:	kV:	65
	mAs:	32

- OPERATING PROCEDURE:

1. Remove dentures, hair grips, or anything else in the hair
2. For cervical spine PA position, tell the patient to place the chin against the cassette holder
3. Tell the patient to hold the breath
4. Expose
5. Tell the patient to breathe normally

THORACIC AND LUMBAR SPINE

- MATERIAL:

  Cassette 35 x 43 cm divided by two with, rare earth screens

- POSITION OF THE PATIENT:

  Supine (thoracic or lumbar spine AP)

  Lying on the left (or right) side (thoracic or lumbar spine lateral)

  Supine ; horizontal beam (thoracic or lumbar spine lateral)

- PARAMETERS:

Adults:	kV:	from 65 to 80
	mAs:	from 63 to 120
Infants:	kV:	65
	mAs:	40

- OPERATING PROCEDURE:

  1. For lumbar spine AP, the patient's knees should be bent so that the back is flat on the table
  2. Tell the patient to hold the breath
  3. Expose
  4. Tell the patient to breathe normally

SACRUM, LUMBOSACRAL JUNCTION AND SACROILIAC JOINTS

- MATERIAL:

Cassette 24 x 30 cm with rapid screens

- POSITION OF THE PATIENT:

Supine ; vertical beam angled towards the head at 10° for men and 15° for women

- PARAMETERS:

Adults:	kV:	from 85 to 95
	mAs:	from 63 to 160
Infants:	kV:	75
	mAs:	63

- OPERATING PROCEDURE:

1. Tell the patient to hold the breath
2. Expose
3. Tell the patient to breathe normally

CLAVICLE, SCAPULA AND SHOULDER JOINT

- MATERIAL:

Cassette 24 x 30 cm with rapid screens

- POSITION OF THE PATIENT:

Supine ; vertical beam angled 20° towards the head (clavicle AP)

Supine (scapula)

Sitting erect (scapula lateral)

Supine ; vertical beam angled 10° towards the feet (shoulder AP)

Supine (shoulder AP abducted)

Sitting erect (shoulder AP: after injury)

Sitting erect (shoulder lateral: after injury)

- PARAMETERS:

Adults:	kV:	from 60 to 75
	mAs:	from 40 to 120
Infants:	kV:	55
	mAs:	from 6 to 20

- OPERATING PROCEDURE:

1. Put a pillow under the head for each supine position
2. For scapula lateral position raise the arm with the hand behind the head
3. For supine shoulder AP position, place a pillow under the normal shoulder and turn the patient so that the shoulder to be X rayed lies flat on the table.
4. Expose

HUMERUS

- MATERIAL:

Cassette 35 x 43 cm divided by two, with rapid screens

- POSITION OF THE PATIENT:

Supine (humerus AP and lateral)

Sitting erect (humerus AP: after injury)

Sitting erect (humerus lateral: after injury)

- PARAMETERS:

Adults:	kV:	from 55 to 70
	mAs:	from 8 to 25
Infants:	kV:	50
	mAs:	4

- OPERATING PROCEDURE:

1. For supine position, rotate the arm outwards, palm of the hand facing up for a first picture, and angle downwards for the second picture

2. For sitting erect, humerus AP ,the patient's forearm should be at right angle to the cassette holder

3. For sitting erect, humerus lateral, the patient's forearm should be against the cassette holder

4. Expose

ELBOW

- MATERIAL:

  Cassette 18 x 24 cm, with rapid screens

- POSITION OF THE PATIENT:

  Sitting with the arm in supine position (elbow AP)

  Sitting (elbow lateral)

  Sitting with the arm in supine position (elbow AP semi-flexed: after injury)

- PARAMETERS:

Adults:	kV:	from 50 to 60
	mAs:	from 6 to 10
Infants:	kV:	45
	mAs:	4

- OPERATING PROCEDURE:

  1. For elbow AP the palm of the patient's hand should be facing up
  2. Expose

FOREARM

- MATERIAL:

  Cassette 24 x 30 cm, with rapid screens

- POSITION OF THE PATIENT:

  Sitting with the arm in supine position (forearm AP)

  Sitting (forearm lateral)

  Sitting with the arm in prone position and the elbow flexed (forearm PA: after injury)

- PARAMETERS:

Adults:	kV:	from 50 to 60
	mAs:	from 4 to 12
Infants:	kV:	45
	mAs:	3

- OPERATING PROCEDURE:

  1. For forearm AP the palm of the patient's hand should be facing up
  2. For forearm lateral, the thumb should be uppermost
  3. For forearm PA the palm of the patient's hand should be facing down
  4. Add 15 kV if the arm is in a plastter
  5. Expose

WRIST, HAND AND FINGERS

- MATERIAL:

  Cassette 18 x 24 cm or 24 x 30 cm, with rapid screens

- POSITION OF THE PATIENT:

  Sitting (wrist PA)

  Standing or sitting (wrist lateral)

  Sitting (hand PA and oblique)

  Standing (finger lateral)

- PARAMETERS:

Adults:	kV:	from 40 to 46
	mAs:	from 4 to 10
Infants:	kV:	40
	mAs:	2

- OPERATING PROCEDURE:

  1. For wrist PA the hand should be straight with the palm facing down
  2. For wrist lateral, the thumb should be uppermost
  3. For a finger lateral, extend the finger to be X rayed horizontally
  4. Expose

PELVIS AND HIP JOINTS

- MATERIAL:

Cassette 36 x 43 cm or 24 x 30 cm, with rare earth screens

- POSITION OF THE PATIENT:

Supine (pelvis AP)

Supine (hip joint AP)

Supine (hip joint lateral: no injury)

Supine ; X ray beam angled at 65° from the vertical position (hip joint lateral: if a fracture is detected)

- PARAMETERS:

Adults:	kV:	from 65 to 75
	mAs:	from 63 to 100
Infants:	kV:	50
	mAs:	12

- OPERATING PROCEDURE:

1. For pelvis AP and hip joint AP, turn the feet heels apart and toes together

2. For hip joint lateral, no injury, turn the patient on the affected side so that the leg is flat on the table

3. Expose

FEMUR

- MATERIAL:

Cassette 36 x 43 cm divided by two, with rare earth screens

- POSITION OF THE PATIENT:

Supine (femur AP)

Lying on the right (or left) side (femur lateral: no injury)

Supine ; horizontal beam (femur lateral: after injury)

- PARAMETERS:

Adults:	kV:	from 55 to 60
	mAs:	from 12 to 24
Infants:	kV:	46
	mAs:	10

- OPERATING PROCEDURE:

1. For femur lateral, no injury place the patient with the leg to be X rayed underneath and bend the normal leg

2. For femur lateral, after injury, place the patient so that the injured leg is nearest to the cassette and bend the uninjured leg

3. Expose

KNEE

- MATERIAL:

Cassette 18 x 24 cm , with rapid screens

- POSITION OF THE PATIENT:

Supine (knee AP)

Lying on the right (or left) side (knee lateral: no injury)

Supine ; horizontal beam (knee lateral: after injury)

Supine ; vertical beam angled 30° towards the head (knee intercondylar space)

Standing (patella axial)

- PARAMETERS:

Adults:	kV:	from 52 to 58
	mAs:	from 12 to 24
Infants:	kV:	46
	mAs:	10

- OPERATING PROCEDURE:

1. For knee lateral, no injury place the patient with the leg to be X rayed underneath and bend the normal leg

2. For knee lateral, after injury, place the patient so that the injured leg is nearest to the cassette and raise the uninjured leg so that it is higher than the cassette

3. For intercondylar space, place the cassette under the knee on a firm support 18-20 cm high

4. For patella axial, place the cassette on top of the cassette holder on a stool

5. Expose

LEG

- MATERIAL:

Cassette 36 x 43 cm divided by two or 18 x 24 cm, with rare earth screens

- POSITION OF THE PATIENT:

Supine (leg AP)

Lying on the right (or left) side (leg lateral: no injury)

Supine ; horizontal beam (leg lateral: after injury)

Sitting on the table (ankle joint: internal oblique and AP)

Sitting or lying on the table (ankle joint: lateral and external oblique)

- PARAMETERS:

Adults:	kV:	from 52 to 54
	mAs:	from 8 to 12
Infants:	kV:	46
	mAs:	6

- OPERATING PROCEDURE:

1. For leg lateral, no injury place the patient with the leg to be X rayed underneath and bend the normal leg

2. For leg lateral, after injury, if there are splints on the injured leg, leave them on and bend the uninjured leg

3. Expose

FOOT AND TOES

- MATERIAL:

Cassette 24 x 30 cm, with rare rapid screens

- POSITION OF THE PATIENT:

Supine ; vertical beam angled 10° towards the head (foot and toes AP)

Lying on the right (or left) side (foot lateral)

Sitting on the table ; vertical beam angled 10° towards the head (foot AP oblique)

Prone (foot PA oblique)

Supine ; vertical beam angled 30° towards the head (heel semi-axial)

- PARAMETERS:

Adults:	kV:	from 42 to 50
	mAs:	from 6 to 10
Infants:	kV:	40
	mAs:	4

- OPERATING PROCEDURE:

1. For foot and toes AP bend the patient's leg so that the foot rests flat on the table
2. For heel semi-axial the foot should be kept flexed by means of a sling held by the patient
3. Expose

TABLE

Chest PA	Standing or sitting erect: ribs oblique AP
Chest lateral	
	Supine: ribs oblique AP
Chest AP	
Chest AP	
Chest lateral decubitus	
Abdomen AP	Urinary tract AP
Abdomen PA	Bladder and inner pelvis
Abdomen, lateral decubitus	
Skull lateral	All positions
Skull PA	
Skull AP	
Skull semi-axial	
Mandible PA	Cervical spine PA
	Cervical spine lateral
Mandible oblique lateral	Cervical spine oblique
Mandible AP	Cervical spine AP
Mandible oblique lateral	Cervical spine lateral

Thoracic spine AP	All positions
Thoracic spine lateral	
Lumbar spine AP	
Lumbar spine lateral	

Clavicle AP	Humerus AP and lateral
Scapula AP	Humerus AP: after injury
Shoulder AP abducted	Humerus lateral: after injury
Scapula lateral	
Shoulder AP: after injury	
Shoulder lateral: after injury	
Shoulder AP	All positions

All positions	All positions

Pelvis AP
Hit joint AP
Hit joint lateral

Hit joint lateral: if a fracture is suspected

Femur AP	Knee AP
Femur lateral	
	Knee lateral: no injury
Femur lateral: after injury	
	Knee lateral: after injury
	Knee intercondylar space
	Patella axial

Leg AP	Foot and toes AP
Leg lateral: no injury	
Ankle joint: all positions	
	Foot PA oblique
Leg lateral after injury	Foot lateral
	Foot AP oblique
	Heel semi-axial